

Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (second year)

Subject: Botany

Course Code: BOC 103

Course Title: Plant Anatomy and Embryology

Unit: 07

Module Name: Structure of mature seed

Name of the Presenter: Ms. Shubhra B. Bhende, M.Sc.

Mature seed

- A true seed is defined as a **fertilized mature ovule** that possesses embryonic plant (with a radicle and plumule), stored material and a protective coat or coats.
- Seed is the reproductive structure characteristic of all phanerogams.

Structure of mature dicot seed ex. *Pisum sativum*

- The seeds are attached to the fruit wall by a small stalk, the **funiculus**.
- At maturity, on one side of the seed coat a narrow, elongated scar representing the point of attachment of seed to its stalk is distinctly seen, this is the **hilum**.
- Close to the hilum situated at one end of it there is a minute pore, **micropyle**. During seed germination, water is absorbed mainly through this pore, and the radicle comes out through it.
- Continuous with the hilum there is sort of ridge in the seed coat, the **raphe**.

- The seed is covered by two distinct seed coats; the outer whitish one is the **testa**, while the other inner thin, hyaline and membranous covering is the **tegmen**.
- The seed coats give necessary protection to the embryo which lies within.
- The whitish fleshy body, as seen after removing the seed-coats is the embryo.
- It consists of two fleshy cotyledons and a short axis to which the cotyledons remain attached.
- The position of the axis lying outside the cotyledons, bent inward and directed towards the micropyle is the **radicle** and the other portion of the axis lying in between the two cotyledons is the **plumule**.
- The plumule is crowned by some minute young leaves.
- The radicle gives rise to the root, the plumule to the shoot and the cotyledons store up food material.

Structure of mature monocot seed ex. *Zea mays*

- A maize grain is a single-seeded fruit in which the seed coat and the fruit wall are un-separable.
- On one side of the grain a small, opaque, whitish, deltoid area is seen to be distinctly marked out from the region.
- The embryo lies embedded in this area.
- There is only a thin layer surrounding the whole grain.
- This layer is made up of the seed-coat and the wall of the fruit fused together.

- The grain remains divided into two unequal portions by a definite layer known as the **epithelium**.
- The bigger portion is the endosperm, and the smaller portion, the embryo.
- The embryo consists of one shield shaped cotyledon, known as the scutellum and axis.
- The upper portion of the axis, with minute leaves arching over it, is the plumule, and the lower portion provided with the root cap the radicle.
- The plumule is surrounded by a leaf-sheath or coleoptile and the radicle is surrounded by a root sheath or coleorhiza.
- These are the protective sheaths of the plumule and the radicle respectively.

Special structure of seed

- Besides the basic structures (**endosperm, embryo and seed-coat**) certain special structures may arise during seed development.
1. In **castor bean** a fleshy whitish tissue, the **caruncle**, develops at one end of the seed.
 - It is derived from the integument.
 2. The juicy edible part of the litchi fruit (aril) is an outgrowth of the funiculus that develops after fertilization.
 3. The cotton fibres are the elongated epidermal cells of the seed-coat.
 - These fibres are single-celled and thin walled.
 - They attain a length of upto 45 mm and have characteristic twists.